USDA FOREST SERVICE

RESEARCH NOTE NC-163

NORTH CENTRAL FOREST EXPERIMENT STATION, FOREST SERVICE—U.S. DEPARTMENT OF AGRICULTURE

Folwell Avenue, St. Paul, Minnesota 55101

LARCH LITTER REMOVAL HAS NO SIGNIFICANT EFFECT ON RUNOFF

ABSTRACT.--Runoff was measured on paired litter-removed, litter-left plots in an 11-year-old European larch plantation. On five of the six pairs of plots, the plot with the litter left intact yielded more runoff. However, the differences were neither statistically nor hydrologically significant.

OXFORD: 462:116.21(775):174.7 *Larix decidua*. KEY WORDS: overland flow, infiltration, forestation, watershed management.

European larch (*Larix decidua* Mill.) grows fast and produces heavy litter. Ten-year-old plantations on the Coulee Experimental Forest in southwestern Wisconsin had twice as much litter (by weight) as 10-year-old red pine (*Pinus resinosa* Ait.) plantations (Sartz and Harris 1972). However, the thick, tightly packed larch needle mat is not necessarily a hydrologic blessing. It could shed water like a thatched roof. Finding dry soil under larch litter after heavy rainfall suggested that it might--or that the needles might contain a hydrophobic substance, as reported for western chaparral by Krammes and DeBano (1965) and for Utah juniper (*Juniperus osteosperma* (Torr.) Little) by Scholl (1971).

Ring infiltrometer measurements in larch plots with and without litter did indeed indicate that larch litter may retard infiltration. However, a more conclusive test was needed.

Six pairs of runoff plots were installed in a sloping (25 percent) 11-year-old plantation. Each plot was enclosed by a sheet metal cylinder 75 cm in diameter by 20 cm deep pushed halfway into the soil. A 2.5-cm outlet pipe at the ground surface led runoff water through a plastic hose to a collector drum. After installation, the litter was carefully removed from one plot of each pair and replaced by a thin layer of pine needles to prevent puddling. Paired plots were 2 m apart.

The plots were installed in May 1972 and were maintained through the summer and fall of 1972. Runoff was measured after heavy rainfall, of which there were four periods, including one 15-cm storm.

On five of the six pairs of plots, the plot with the litter left intact yielded more runoff (table 1). The season total averages were 1.67 cm for the litter-left plots and 1.00 cm for the litter-removed plots. Although a two-thirds difference appears to be large, the amount of runoff from both litter-left and litter-removed plots was small in terms of total rainfall: 5 and 3 percent respectively. Thus, the difference is not large enough to be hydrologically important.

LITERATURE CITED

Krammes, J. S., and L. F. DeBano. 1965. Soil wettability: A neglected factor in watershed management. Water Resour. Res. 1: 283-286.

Table 1.--*Runoff from individual plots for four storm periods*
(In centimeters)

Plot number	Storm date and litter condition[1]									
	8/21		9/1		9/13		9/26		Total	
	L	R	L	R	L	R	L	R	L	R
1	0.27	0.27	0.07	0.09	0.29	0.09	0.32	0.05	0.95	0.50
2	2.42	.38	.67	.07	.32	.00	.36	.09	3.77	.54
3	.68	.50	.27	.08	.23	.04	.18	.19	1.36	.81
4	.68	.11	.14	.04	.04	.04	.12	.10	.98	.29
5	.98	.75	.16	.10	.32	.36	.10	1.68	1.56	2.89
6	.68	.50	.19	.08	.20	.16	.11	.23	1.18	.97
Mean	.95	.42	.25	.08	.23	.11	.20	.39	1.67	1.00
Rainfall	5.87		5.03		6.27		15.24		32.41	

[1]L=litter left, R=litter removed.

Sartz, Richard S., and Alfred Ray Harris. 1972. Growth and hydrologic influence of European larch and red pine 10 years after planting. USDA For. Serv. Res. Note NC-144, 4 p., illus. North Cent. For. Exp. Stn., St. Paul, Minn.

Scholl, David G. 1971. Soil wettability in Utah juniper stands. Soil Sci. Soc. Am. Proc. 35: 344-345.

RICHARD S. SARTZ
Principal Hydrologist
DAVID N. TOLSTED
Forest Research Technician
Forest Watershed Laboratory
La Crosse, Wisconsin
(Laboratory maintained in cooperation with the Wisconsin Department of Natural Resources)

1974